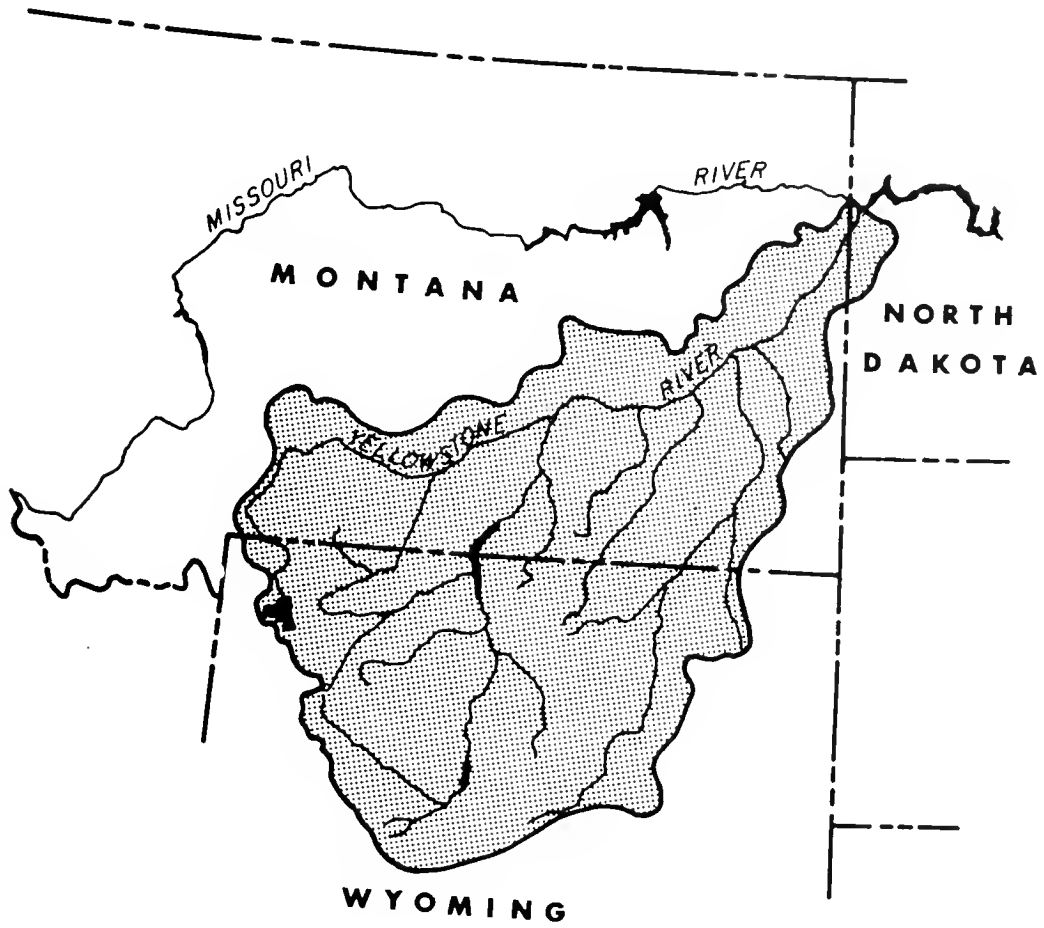
YELLOWSTONE RIVER COMPACT COMMISSION

WYOMING MONTANA NORTH DAKOTA



FORTIETH ANNUAL REPORT

1991

YELLOWSTONE RIVER

COMPACT COMMISSION

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YELLOWSTONE RIVER COMPACT COMMISSION
821 EAST INTERSTATE AVENUE
BISMARCK, NORTH DAKOTA 58501

Honorable Mike Sullivan
Governor of the State of Wyoming
Cheyenne, Wyoming 82001

Honorable Stan Stephens
Governor of the State of Montana
Helena, Montana 59620

Honorable George Sinner
Governor of the State of North Dakota
Bismarck, North Dakota 58501

Dear Sirs:

Pursuant to Article III of the Yellowstone River Compact (Compact) the Commission submits the following fortieth annual report of activities for the period ending September 30, 1991.

Members of the Yellowstone River Compact Commission (Commission) convened a conference call meeting on March 20, 1991, to discuss items of interest. In attendance were W. F. Horak, Jr., Federal Representative; Gordon W. (Jeff) Fassett, Representative for the State of Wyoming; Gary Fritz, Representative for the State of Montana; Joe A. Moreland, Recording Secretary; and Sue Lowry, Wyoming State Engineer's Office.

Mr. Horak reviewed the recent developments related to the Federal Representative's inability to cast deciding votes on matters of disagreement between the State Representatives. He stated that the Federal Representative had been advised in 1986 by the Field Solicitor that the Compact was unambiguous about the Federal Representative's role in voting on such issues, but that the U.S. Geological Survey had not wanted the Chairman at that time to vote on issues of controversy. He commented that Gary Fritz formally requested an opinion from the current Chairman regarding the role of the Federal Representative. In his letter to the Chairman, Mr. Fritz had stated that Montana was prepared to ask the Director of the Geological Survey to appoint an alternate Federal Representative with voting authority if the current Chairman was unable to fulfill the role outlined by the Compact. Mr. Horak stated that Mr. Fritz's position was clear but that he wanted to know Mr. Fassett's view before taking further action.

Mr. Fassett responded that Wyoming agreed that the Federal Representative must have the authority to cast votes on issues of disagreement. He also stated that the States have an obligation to develop a process to ensure that issues brought before the Commission for resolution are thoroughly examined first by the State Representatives.

Mr. Fassett and Mr. Fritz stated that the District Chief of North Dakota is uniquely qualified to serve as Chairman and Federal Representative on the Commission. They agreed to draft a letter to the Director stating their desire to retain the current Chairman, but requesting that he be granted authority to vote on issues of disagreement. They also affirmed the need to develop a process to prevent frivolous matters from being brought to a vote of the Commission.

Mr. Fritz reported that a compact between Montana and the Northern Cheyenne Indian Reservation was imminent. He stated that the compact was designed to avoid any conflict with the Yellowstone River Compact. He suggested that Ms. Lowry meet with Glen McDonald (Montana Department of Natural Resources and Conservation) to ensure that Wyoming is not adversely affected by the agreement.

Mr. Fassett stated that Wyoming is very interested in the negotiations and requested a copy of the draft compact.

Mr. Fritz stated that the final draft would be available in about one week and that a public hearing would be held during the week of April 9, 1991. He offered to discuss the implications of the compact with the Wyoming congressional delegation before it is presented to the U.S. Congress for authorization.

The members discussed the need for a spring meeting of the Commission and agreed that such a meeting was not necessary.

The Commission held its annual meeting in Sheridan, Wyoming, on December 16, 1991. Mr. Gordon W. (Jeff) Fassett, Wyoming State Engineer, the designated Representative for Wyoming; Mr. Gary Fritz, Administrator, Water Resources Division, Montana Department of Natural Resources and Conservation, the designated Representative for Montana; and Mr. W. F. Horak, Jr., U.S. Geological Survey, the designated Federal Representative and Chairman, were present.

Others present included:

Craig Cooper, Wyoming State Board of Control, Riverton, Wyoming;
Keith Kerbel, Montana Department of Natural Resources and Conservation, Billings, Montana;
Sue Lowry, Wyoming State Engineer's Office, Cheyenne, Wyoming;
Rebecca L. Mathisen, Wyoming State Engineer's Office, Cheyenne, Wyoming;
Glen McDonald, Montana Department of Natural Resources and Conservation, Helena, Montana;
Joe A. Moreland, U.S. Geological Survey, Helena, Montana;

Jill Morrison, Powder River Basin Resource Council, Sheridan, Wyoming;
Michael Whitaker, Wyoming State Board of Control, Sheridan, Wyoming;
Milo Vukelich, Wyoming Attorney General's Office, Cheyenne, Wyoming;
Bruce Yates, HKM Associates, Sheridan, Wyoming.

Mr. Horak called the meeting to order at 10:30 a.m. and introduced members and representatives. The following items of business were discussed:

1. BUDGET:

Mr. Moreland reported that the budget for fiscal year 1991 was $39,500, which covered the cost of operating four streamflow-gaging stations specified in the Compact, plus preparation of the annual report. Work was funded through cooperative agreements whereby Montana and Wyoming each contribute one-quarter of the cost and the U.S. Geological Survey contributes one-half of the cost. Mr. Moreland reported that additional expenses incurred to rebuild a cableway at the Clarks Fork Yellowstone River gaging station at Edgar, Montana, were provided by the U.S. Geological Survey. He estimated that costs for the program for the current year would be $40,700. Projected inflationary rates of 5 percent per year would result in total costs of $42,900 for fiscal year 1993 and $45,200 for fiscal year 1994.

2. STREAMFLOW AND RESERVOIR REPORT:

Mr. Moreland distributed tabular summaries and graphical displays of streamflow records and reservoir contents for the water year ending September 30, 1991. Annual streamflow was normal in three of the four monitored tributaries to the Yellowstone River. Flow in the Powder River as measured at the gaging station near Locate, Montana, was 76 percent of long-term average. Flow in the Clarks Fork Yellowstone River at Edgar, Montana, adjusted for diversions to the Whitehorse Canal, was 728,100 acre-feet. Flow in the Bighorn River above Tullock Creek, near Bighorn, Montana, adjusted for change in contents in Bighorn Lake minus flow in the Little Bighorn River near Hardin, Montana, was 2,783,000 acre-feet. Flow in the Tongue River at Miles City, Montana, was 302,100 acre-feet. Flow in the Powder River near Locate, Montana, was 321,200 acre-feet.

Reservoir contents at the end of the water year for reservoirs completed before 1950 were: Bull Lake, 84,940 acre-feet; Pilot Butte Reservoir, 13,230 acre-feet; Buffalo Bill Reservoir, 275,000 acre-feet; and Tongue River Reservoir, 20,080 acre-feet. Reservoir contents at the end of the water year for reservoirs completed after 1950 were: Boysen Reservoir, 646,900 acre-feet; Anchor Reservoir, 610 acre-feet; and Bighorn Lake, 1,046,000 acre-feet.

Mr. Moreland reported that three sets of concurrent measurements

were made on the Clarks Fork Yellowstone River to document differences in streamflow at the current gaging station at Edgar and the discontinued downstream gaging site near Silesia. The Compact states that the point of measurement for the Clarks Fork Yellowstone River shall be below the last diversion from Clarks Fork above Rock Creek.

Originally, the U.S. Geological Survey operated a gaging station at Edgar about 6 miles upstream from the mouth of Rock Creek. Between the gaging site and the mouth of Rock Creek, the Whitehorse Canal diverts a significant amount of water from the Clarks Fork. In addition, substantial inflow occurs between the gaging site at Edgar and the measurement point specified by the Compact. A major, but unknown, portion of the inflow is thought to be irrigation return flow from lands irrigated with water from the Rock Creek drainage--not part of the Clarks Fork Yellowstone River basin included in the Compact.

In the early years of the Compact, annual estimates of diversions to the Whitehorse Canal were reported, but no adjustments were made to the streamflow records. During the late 1960's many measurements of streamflow were made near the mouth of Rock Creek in an attempt to document the quantity of intervening inflow. Results were inconclusive and the Commission decided to relocate the gaging station to a site near Silesia downstream from the Whitehorse Canal. The alternative measuring site, known as Clarks Fork Yellowstone River near Silesia, was established in 1969 and operated until 1986. No adjustments to the measured flow were made to account for irrigation return flows from Rock Creek irrigation. In 1986, severe bank erosion threatened the gaging station and, with concurrence from the Commission, the U.S. Geological Survey reestablished the gaging station at Edgar.

From 1986 to the current year, diversions to the Whitehorse Canal have been measured and subtracted from the recorded flow at Edgar to provide the information specified by the Compact. Consequently, three periods of record exist for the Clarks Fork Yellowstone River and none are equivalent. The period 1921 through 1969 has record for the station at Edgar with no adjustments for canal diversion. The period 1970 through 1985 has record for the station near Silesia downstream from the diversion to Whitehorse Canal and inflow from Rock Creek irrigation. The period 1986 to present has record for the station at Edgar adjusted for diversion to the canal, but without adjustment for intervening inflow from irrigation.

The three sets of concurrent measurements at the Edgar and Silesia gaging sites showed the following rates of inflow after diversions to Whitehorse Canal were accounted for:

1. September 5, 1991: 52 ft^3/s when flow at Edgar was 164 ft^3/s.
2. October 4, 1991: 59 ft^3/s when flow at Edgar was 561 ft^3/s.
3. October 16, 1991: 39 ft^3/s when flow at Edgar was 456 ft^3/s.

Diversions to Whitehorse Canal ranged from 12 to 20 ft^3/s during the period of concurrent measurements.

Mr. Moreland reported that bank erosion at the Clarks Fork Yellowstone River gaging site at Edgar required relocation of cableway anchors during the 1991 water year. New anchors were installed to eliminate hazardous conditions. Funding for the rehabilitation work was obtained from the U.S. Geological Survey's Collection of Basic Records program. Cost of the work was about $6,000.

Mr. Moreland briefly discussed the increasing difficulty in acquiring stage information at the Tongue River at Miles City gaging station during periods of low flow. The main low-flow channel has migrated across the river bed and is now located a considerable distance from the gaging station. A more suitable site where the stream channel is more constrained may exist a short distance downstream from the current gaging station. The alternate site will be inspected during high-flow conditions in the spring of 1992 to determine if relocation of the gaging station is feasible. If relocation is considered advisable and feasible, a proposal to establish an alternate gaging site will be presented to the Commission at the next annual meeting. Cost of relocating the site may be $6,000-$8,000.

Mr. Horak commented that the U.S. Geological Survey plans to remove mercury manometers from all gaging stations by 1997 and advised the State Representatives that some cost may be involved to install alternate monitoring and recording instrumentation. All four gaging stations operated in support of the Compact are currently equipped with mercury manometers, which will be replaced as part of the nationwide conversion. Mr. Moreland stated that the schedule for conversion and the funding mechanism to acquire and install replacement instruments are still uncertain.

3. FEDERAL MEMBER'S VOTING STATUS:

Mr. Horak reported that the position of the U.S. Geological Survey on the issue of the Federal member's voting status has not changed since the matter was discussed at the 1986 annual meeting. No U.S. Geological Survey employee will be able to cast tie-breaking votes on any issue brought to a vote before the Commission. It was noted that each of the State Representatives has had discussions with the Chief Hydrologist of the U.S. Geological Survey, Philip Cohen. Mr. Horak asked the Representatives to comment on their current positions.

Mr. Fritz reported that he had discussed his concerns with the Chief Hydrologist on two occasions. Mr. Cohen had stated that the U.S. Geologial Survey has always maintained a position of neutrality, which could be compromised if the Federal member were asked to cast a tie-breaking vote by the Commission. Mr. Fritz stated that he reaffirmed Montana's position that the Federal member was viewed as an important and integral part of the Commission and

not as a U.S. Geological Survey employee.

Mr. Fassett reported that he also had discussed the issue with the Chief Hydrologist and the conversation followed essentially the same lines of discussion. He stated that Mr. Cohen had expressed concern that cooperative relationships with Montana and Wyoming might be strained if the Federal member were forced to side with one State against the other by casting a deciding vote on a controversial issue. Mr. Cohen had stated that the only way to avoid placing the U.S. Geological Survey in a position that might strain cooperative relationships and threaten the Survey's long-standing tradition of neutrality would be to abstain from all tie-breaking votes.

Mr. Fassett reaffirmed Wyoming's opinion that the U.S. Geological Survey representative is uniquely qualified to serve as an arbitrating official on technical issues related to the Compact. He stated that U.S. Geological Survey membership on the Commission has afforded the Survey an opportunity to develop strong cooperative ties with both Montana and Wyoming. He cited the recently completed study of water-quality trends in the Powder River Basin as an example of investigative hydrology that resulted from the Survey's familiarity with technical problems in the area. He expressed concern that replacement of the Federal member with a non-U.S. Geological Survey representative could ultimately erode the Survey's traditional stature as technical experts knowledgeable in local hydrologic issues to a position of providers of basic hydrologic information.

Mr. Fritz stated that Montana would like to continue discussions with the Chief Hydrologist to explore options for conflict resolution and hopefully retain the traditional U.S. Geological Survey involvement in Commission activities. He commented that he would ask Mr. Matt McKinney (Montana Department of Natural Resources and Conservation) to prepare a draft paper on conflict resolution for the Commission. Mr. Fritz and Mr. Fassett agreed to consider the issue further and advise Mr. Horak of their decision on how to proceed.

4. INTERSTATE WATER MARKETING:

Mr. Fassett reported that Wyoming had conducted a test release of water from the DeSmet Reservoir to determine if an interstate sale of water to a Montana water user would be feasible. He stated that any sale of water in excess of 1,000 acre-feet would have to be approved by the Wyoming State legislature. Approval would require at least a year. The Wyoming State Engineer would have to make the request.

Mr. Whitaker reported that the test release yielded inconclusive results. U.S. Geological Survey gaging stations did not function properly during the release period and gate problems resulted in variable release rates.

5. WYOMING WATER DEVELOPMENT COMMISSION ACTIVITIES:

Mr. Fassett reported on several Water Development Commission projects, including the Greybull Valley Dam, Sheridan Area Water Supply project, Adelaide enlargement, and the Middle Fork project.

The Greybull Valley Dam project would have a 40,000 acre-foot capacity, would capture surplus water, would provide supplemental water, would not be used to irrigate new lands, and would be used to minimize daily fluctuations in flow. Mr. Fassett reported that the project sponsors may request construction funds in 1993.

The Sheridan Area Water Supply project involves potential enlargement of existing storage facilities and a new distribution system. Increased storage capacity would be about 2,000 acre-feet.

The Adelaide project in the Shell Creek drainage involved a $2.4 million enlargement of an existing storage facility. The project has been completed.

Mr. Fassett reported that the Middle Fork project is still on the Wyoming Water Development Commission's list but that no work has been performed recently.

6. MISCELLANEOUS INFORMATION:

Mr. Fassett provided an update on coal-bed methane activities. He stated that the interest in methane production from shallow coal beds in Campbell County has waned in recent months. The projects encountered a considerable volume of ground water that altered the economics of development. Local water users continue to express concern about the potential impacts of dewatering aquifers that are currently used for domestic and stock supplies. He stated that Wyoming has a task force comprised of State and Federal representatives that meets quarterly to review the status of methane production from coal beds. Mr. Fritz stated that Montana is not opposed to production but has asked the U.S. Bureau of Land Management to monitor impacts closely. Large-scale developments would require a comprehensive Environmental Impact Assessment that would address Montana's concerns.

Mr. Fassett reported that the Clarks Fork Wild and Scenic Rivers designation has been finalized. The U.S. Forest Service has 5 years to quantify instream flows necessary to preserve the wild and scenic character of the 25-mile reach of river. Wyoming will issue instream flow rights but they will not be Federal reserved water rights. He anticipates that the requested flows will be a substantial part of the annual flow.

Mr. Fassett reported that the Buffalo Bill Dam rehabilitation project is nearing completion. The only work remaining involves completion of recreational facilities and final cleanup. Mr. Fritz

asked if operation procedures for the expanded facilities were included in the Federal legislation for the project. Mr. Fassett explained that Wyoming controls the enlargement portion of the facilities and will be responsible for maintaining minimum flow. The Wyoming Game and Fish Department will conduct studies to determine minimum flow requirements. Mr. Fritz requested a copy of the operating agreement to review. Montana is currently negotiating with the U.S. Congress on the issue of operation of the Tongue River Dam and is interested in Wyoming's approach to retaining State responsibility for maintaining minimum flows.

Mr. Fassett reported that Wyoming and the Wind River Indian Reservation are continuing litigation over conversion of water rights. The courts have granted the tribes control of water but Wyoming has argued that control does not give the tribes the right to convert reserved water rights to uses unrelated to the purposes for which the rights were established. Mr. Fassett stated that the issue will likely require a U.S. Supreme Court ruling.

Mr. Fassett reported that the Little Big Horn Project is proceeding. Studies are underway for various permits for the project. Foreign investors have expressed continued interest in the project and a market for peaking power still looks promising. Developers will have about 2-3 years to obtain a license for the project after permits are issued.

Mr. Fritz reported that the Northern Cheyenne compact has been approved by the Montana legislature. Federal legislation has been introduced to approve and implement the compact. The compact includes a funding mechanism to increase storage capacity in the Tongue River Reservoir. The U.S. Departments of Justice and the Interior have expressed some opposition to the agreed funding mechanism, but Montana is confident that the project will be approved. Montana plans to proceed with preparation of an Environmental Impact Statement to avoid future delays in the project.

Mr. Kerbel reported that Montana's general adjudication of water rights is proceeding. Work in the Clarks Fork Yellowstone River basin has been essentially completed. A temporary preliminary decree on 3,000 water rights will be issued in 1992. Mr. Fassett requested that Wyoming be notified when decrees are issued by the Montana Water Court.

Mr. Fassett reported that the request for water rights for the Pennoyer Ditch project has been essentially completed in conformance with the Compact rules for interstate ditches. He stated that the issue was ready for action by the Commission. Ms. Lowry stated that the project, which involves about 165 acres, has been reviewed by both Montana and Wyoming. She will submit notes, maps, and other relevant material to the Commission for final action.

A new permit application has been filed for the McCarthy ditch. The project will involve multiple diversions to irrigate land in Wyoming and Montana.

The Commission representatives agreed to handle Pennoyer Ditch request via a phone meeting in the near future. The representatives agreed to await completion of Mr. McKinney's draft report on conflict resolution before deciding on the need for a spring meeting.

Having no other business, the meeting was adjourned at 2:20 p.m.

Respectfully submitted,

Gordon W. Fassett
Commissioner for Wyoming

Gary Fritz
Commissioner for Montana

Wm F. Horak Jr.
William F. Horak, Jr.
Federal Representative

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ILLUSTRATIONS

GENERAL REPORT

Cost of operation and budget

The work funded by the Commission, which to date has been primarily concerned with the collection of required hydrologic data, has been financed through cooperative arrangements whereby Montana and Wyoming each bear one-fourth of the cost and the remaining one-half is borne by the United States. The salaries and necessary expenses of the State and U.S. Geological Survey representatives, and the cost to other agencies of collecting hydrologic data, are not considered as expenses of the Commission.

The expense of the Commission during fiscal year 1991 was $39,500, in accordance with the budget adopted for the year.

The budgets for fiscal years 1992, 1993, and 1994 were tentatively adopted subject to the availability of appropriations.

The budgets for the four fiscal years are summarized as follows:

October 1, 1990, to September 30, 1991 (fiscal year 1991):

Continuation of existing stream-gaging programs $39,500

October 1, 1991, to September 30, 1992 (fiscal year 1992):

Continuation of existing stream-gaging programs $40,700

October 1, 1992, to September 30, 1993 (fiscal year 1993):

Estimate of continuation of existing stream-gaging programs $42,900

October 1, 1993, to September 30, 1994 (fiscal year 1994):

Estimate of continuation of existing stream-gaging programs $45,200

Stream-gaging-station operation

Gaging stations at the measuring sites specified in the Compact were continued in operation and satisfactory discharge records were collected at each station. Locations of gaging and reservoir stations are shown on a map of the Yellowstone River Basin at the end of the report.

During water year 1991, annual streamflow was less than normal[1] in one of the four tributaries of the Yellowstone River as given in the following table:

Station number	Measurement site	Percent of average
06208500	Clarks Fork Yellowstone River at Edgar, Mont., minus diversions to Whitehorse Canal	98
06294500	Bighorn River at Bighorn, Mont., minus Little Bighorn River near Hardin, Mont. Adjusted for change in contents in Bighorn Lake	109
06308500	Tongue River at Miles City, Mont.	99
06326500	Powder River near Locate, Mont.	76

Tabulation of streamflow data for water year 1991 and graphical comparisons with average flows for the preceding year and for selected base periods are given in the section "Monthly summary of discharge for Compact stream-gaging stations."

Diversions

No diversions were regulated by the Commission during the year. The Commissioners considered the need to develop procedures to administer water in accordance with the provisions of the Compact.

Storage in reservoirs

Reservoirs completed after January 1, 1950

Bighorn Lake, a U.S. Bureau of Reclamation project on the Bighorn River, and the largest storage project in the basin, contained 972,200 acre-feet at the beginning of the year and 1,046,000 acre-feet at the close. It fluctuated from 700,300 acre-feet on April 11, 1991, to 1,151,000 acre-feet on June 26, 1991. Boysen Reservoir, located on the Wind River and operated by the U.S. Bureau of Reclamation, began the year with 532,700 acre-feet in storage and ended with 646,900 acre-feet. Monthend and yearend contents and a description of these reservoirs are given in the section "Monthly summary of contents for Compact reservoirs completed after January 1, 1950." The Commission is cognizant of other reservoirs in the Yellowstone River basin and considers their aggregate effect to be insufficient to warrant the collection of storage data at this time.

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[1] The "normal" range is 80 to 120 percent of average.

Reservoirs existing on January 1, 1950

As a matter of record and general information, monthend storage data are given later in the report for reservoirs in existence upstream from the points of measurement on January 1, 1950. These data are pertinent to allocation under Article V, Section C, Item 3 of the Compact.

MONTHLY SUMMARY OF DISCHARGE FOR COMPACT STREAM-GAGING STATIONS

06208500 Clarks Fork Yellowstone River at Edgar, Mont.

LOCATION.--Lat 45°27'58", long 108°50'35", in SE1/4 SE1/4 SE1/4 sec. 23, T. 4 S., R. 23 E., Carbon County, Hydrologic Unit 10070006, on right bank 400 ft downstream from county bridge, 0.5 mi east of Edgar, 6 mi upstream from Rock Creek, and at river mile 22.1, revised.

DRAINAGE AREA.--2,032 mi^2.

PERIOD OF RECORD.--July 1921 to September 1969, October 1986 to current year. Records for October 1969 to September 1986 (published as Clarks Fork Yellowstone River near Silesia) at site 5.8 mi downstream not equivalent owing to diversion in Whitehorse Canal during irrigation season. Records since January 1950 available in annual reports of Yellowstone River Compact Commission.

GAGE.--Water-stage recorder. Elevation of gage is 3,460 ft above National Geodetic Vertical Datum of 1929, from topographic map. Prior to Aug. 31, 1953, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharges: Nov. 26-28, Dec. 13 to Feb. 11, Mar. 1-4. Records good except those for estimated daily discharges, which are poor. Diversions for irrigation of about 41,500 acres, of which about 840 acres are downstream from the station. In addition, about 6,300 acres of land upstream from the station are irrigated by diversions from the adjoining Rock Creek basin. Figures of discharge given herein have the flow of Whitehorse Canal subtracted.

AVERAGE DISCHARGE.--53 years (water years 1922-69, 1987-91), 1,029 ft^3/s, 745,500 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge observed, 10,900 ft^3/s, June 2, 1936, gage height, 8.62 ft; maximum gage height, 8.66 ft, June 6, 1991; minimum discharge, 36 ft^3/s, Apr. 22, 1961.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 9,520 ft^3/s, June 6, gage height, 8.66 ft; minimum discharge, 124 ft^3/s, Aug. 27.

Month	Second-foot days	Mean daily discharge (ft^3/s)	Maximum daily discharge (ft^3/s)	Minimum daily discharge (ft^3/s)	Discharge, in acre-feet (rounded)
October 1990	16,657	537	633	350	33,040
November	16,263	542	621	451	32,260
December	10,996	355	523	150	21,810
January 1991	8,840	285	400	200	17,530
February	12,322	440	660	305	24,440
March	9,638	311	360	230	19,120
April	14,664	489	740	300	29,090
May	73,864	2,383	5,600	416	146,500
June	133,100	4,437	8,020	2,280	264,000
July	45,741	1,476	2,600	523	90,730
August	7,543	243	508	131	14,960
September 1991	17,440	581	1,380	139	34,590
1991 water year	367,068	1,006	8,020	131	728,100

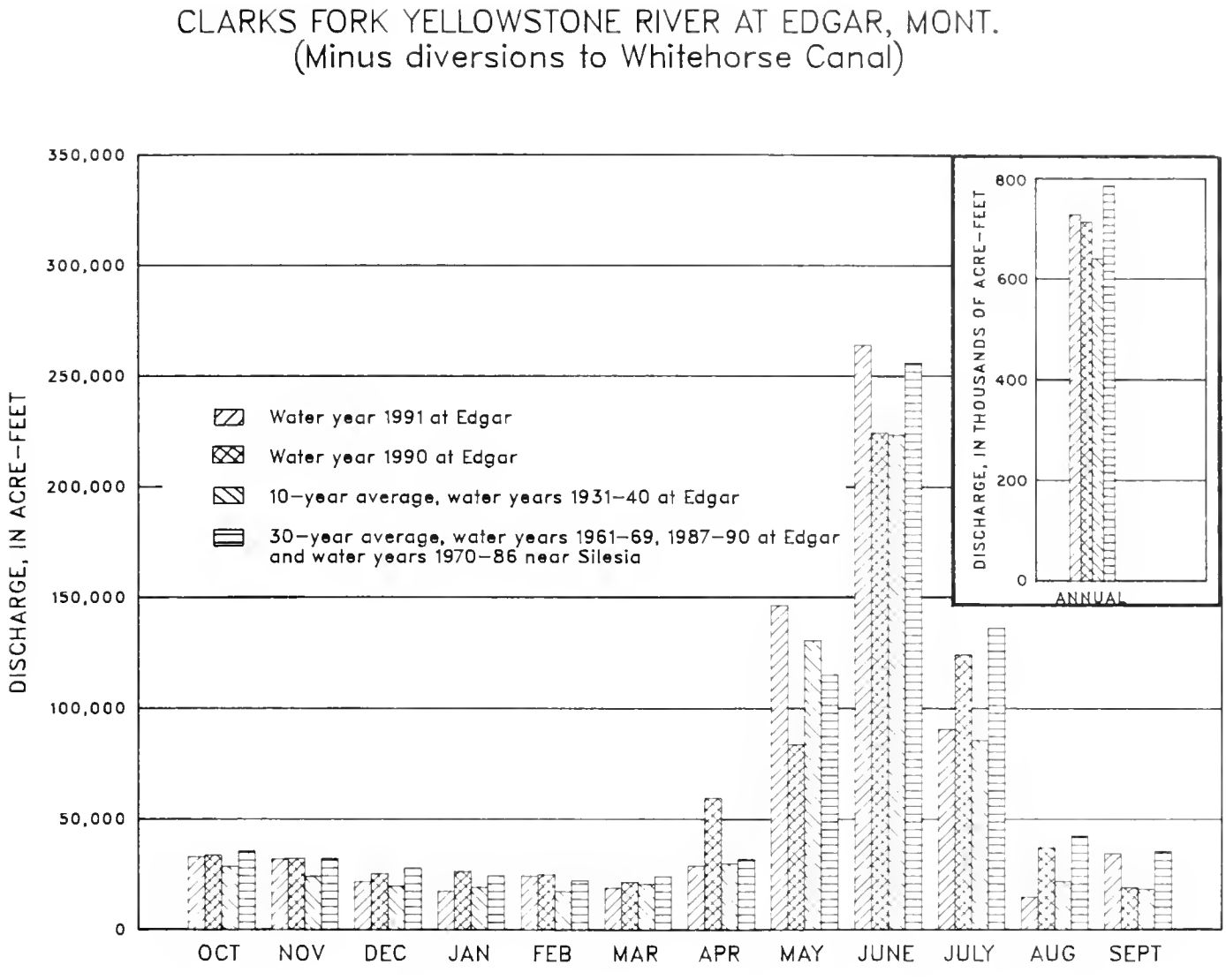

Figure 1.--Comparison of discharge of the Clarks Fork Yellowstone River during water year 1991 with discharge during water year 1990 and with 10-year and 30-year average discharges.

06294000 Little Bighorn River near Hardin, Mont.

LOCATION.--Lat 45°44'09", long 107°33'24", in SE1/4 NE1/4 NE1/4 sec. 19, T. 1 S., R. 34 E., Big Horn County, Hydrologic Unit 10080016, on left bank 50 ft downstream from bridge on Sarpy Road, 0.2 mi upstream from terminal wasteway of Agency Canal, 0.6 mi upstream from mouth, and 2.3 mi east of Hardin.

DRAINAGE AREA.--1,294 mi^2.

PERIOD OF RECORD.--June 1953 to current year. Records since June 1953 available in annual reports of Yellowstone River Compact Commission.

REVISED RECORDS.--WDR MT-86-1: 1978.

GAGE.--Water-stage recorder. Datum of gage is 2,882.29 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to Oct. 7, 1953, nonrecording gage at site 0.4 mi downstream. Oct. 7, 1953, to May 6, 1963, water-stage recorder at site 0.3 mi downstream. May 6, 1963, to Nov. 6, 1963, nonrecording gage at site 0.4 mi downstream. All at different datums. Nov. 7, 1963, to Aug. 15, 1976, water-stage recorder at site 35 ft downstream at present datum. Aug. 15, 1976, to Sept. 30, 1979, water-stage recorders located on each bank downstream of Sarpy Road bridge and were used depending on control conditions.

REMARKS.--Estimated daily discharges: Nov. 27-29, Dec. 17 to Mar. 8. Records good except those for estimated daily discharges, which are poor. Flow partly regulated by Willow Creek Reservoir (capacity 23,000 acre-ft). Diversions for irrigation of 20,980 acres upstream from station. Figures of discharge given herein include flow of terminal wasteway of Agency Canal.

AVERAGE DISCHARGE.--38 years, 295 ft^3/s, 213,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 22,600 ft^3/s, May 19, 1978, gage height, 11.20 ft, used gage height as obtained at bridge on Sarpy Road; maximum gage height, 11.78 ft, Mar. 20, 1960, site and datum then in use, backwater from ice; minimum discharge observed, 0.20 ft^3/s, Aug. 7, 1961, result of discharge measurement.

EXTREMES FOR CURRENT YEAR--Peak discharges greater than base discharge of 1,000 ft^3/s and maximums(*):

Date	Time	Discharge, in ft^3/s	Gage height, in feet
Feb. 5	1610	unknown	a*4.79
May 23	1800	1,310	4.32
June 9	1930	*1,370	4.34

a--backwater from ice.
Minimum daily discharge, 19 ft^3/s, Dec. 22.

Month	Second-foot days	Mean daily discharge (ft^3/s)	Maximum daily discharge (ft^3/s)	Minimum daily discharge (ft^3/s)	Discharge, in acre-feet (rounded)
October 1990	3,299	106	135	51	6,540
November	3,601	120	134	90	7,140
December	2,738	88.3	147	19	5,430
January 1991	2,529	81.6	150	47	5,020
February	5,510	197	300	80	10,930
March	4,281	138	172	100	8,490
April	7,805	260	507	111	15,480
May	19,050	615	1,260	198	37,790
June	24,995	833	1,310	413	49,580
July	4,823	156	383	63	9,570
August	1,973	63.6	87	46	3,910
September 1991	3,728	124	191	60	7,390
1991 water year	84,332	231	1,310	19	167,300

06294500 Bighorn River above Tullock Creek, near Bighorn, Mont.

LOCATION.--Lat 46°07'29", long 107°28'06", in SE1/4 SE1/4 NE1/4 sec. 3, T. 4 N., R. 34 E., Treasure County, Hydrologic Unit 10080015, on right bank, 1.9 mi upstream from Tullock Creek, 3.0 mi upstream from mouth, 3.6 mi southwest of Bighorn, and 4.5 mi southeast of Custer.

DRAINAGE AREA.--22,414 mi^2. Area at site used Oct. 7, 1955, to Sept. 30, 1981, 22,885 mi^2.

PERIOD OF RECORD.--Oct. 1, 1981, to current year. Records since January 1950 available in annual reports of the Yellowstone River Compact Commission. Previously, published as "06294700 Bighorn River at Bighorn, MT," 1956-81, and as "near Custer," 1945-55. Flows are equivalent at all sites.

GAGE.--Water-stage recorder. Elevation of gage is 2,700 ft above National Geodetic Vertical Datum of 1929, from topographic map. May 11, 1945, to Dec. 6, 1945, nonrecording gage, and Dec. 7, 1945, to Oct. 6, 1955, water-stage recorder 1.7 mi upstream at different datum. Oct. 7, 1955, to Sept. 30, 1981, at site 2.3 mi downstream at different datum.

REMARKS.--Estimated daily discharges: Dec. 18 to Jan. 19, Jan. 25 to Feb. 1. Records good except those for estimated daily discharges, which are poor. Flow regulated by Bighorn Lake beginning November 1965 (usable capacity, 1,356,000 acre-ft). Major regulation prior to November 1965 by 14 reservoirs in Wyoming and 1 in Montana with combined usable capacity of about 1,400,000 acre-ft; see section "Monthly summary of contents for Compact reservoirs existing on January 1, 1950." Diversions for irrigation of about 445,200 acres upstream from station.

AVERAGE DISCHARGE.--46 years (water years 1946-81, 1982-91), 3,824 ft^3/s, 2,770,000 acre-ft/yr, unadjusted.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge, 59,200 ft^3/s, May 20, 1978, gage height, 14.15 ft; maximum gage height recorded, 14.21 ft, Apr. 2, 1965, ice jam; minimum discharge, about 275 ft^3/s, Nov. 15, 1959, result of freezeup; minimum daily discharge, 400 ft^3/s, Apr. 4, 1967.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,100 ft^3/s, June 22, 1991, gage height, 7.17 ft; maximum gage height, 9.68 ft, Jan. 31, 1991, ice jam; minimum daily discharge, 1,020 ft^3/s, Oct. 19, 1989.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 16,100 ft^3/s, June 22, gage height, 7.17 ft; maximum gage height, 9.68 ft, Jan. 31, backwater from ice; minimum daily discharge, 1,900 ft^3/s, Dec. 21.

Month	Second-foot days	Mean daily discharge (ft^3/s)	Maximum daily discharge (ft^3/s)	Minimum daily discharge (ft^3/s)	Discharge, in acre-feet (rounded)	Adjusted discharge, in acre-feet*
October 1990	86,530	2,791	3,950	2,550	171,600	166,800
November	84,160	2,805	2,930	2,730	166,900	143,300
December	92,390	2,980	3,900	1,900	183,300	100,300
January 1991	110,120	3,552	4,000	3,000	218,400	109,100
February	86,390	3,085	4,110	2,510	171,400	118,900
March	78,930	2,546	2,770	2,310	156,600	122,900
April	81,120	2,704	3,440	2,250	160,900	159,100
May	102,370	3,302	5,310	2,290	203,100	360,300
June	341,590	11,390	15,200	4,890	677,500	851,500
July	210,240	6,782	13,600	3,150	417,000	290,400
August	78,060	2,518	3,150	2,130	154,800	121,900
September 1991	98,790	3,293	4,560	2,300	195,900	239,500
1991 water year	1,450,690	3,974	15,200	1,900	2,877,000	2,783,000

*Adjusted for change in contents in Bighorn Lake minus Little Bighorn River near Hardin.

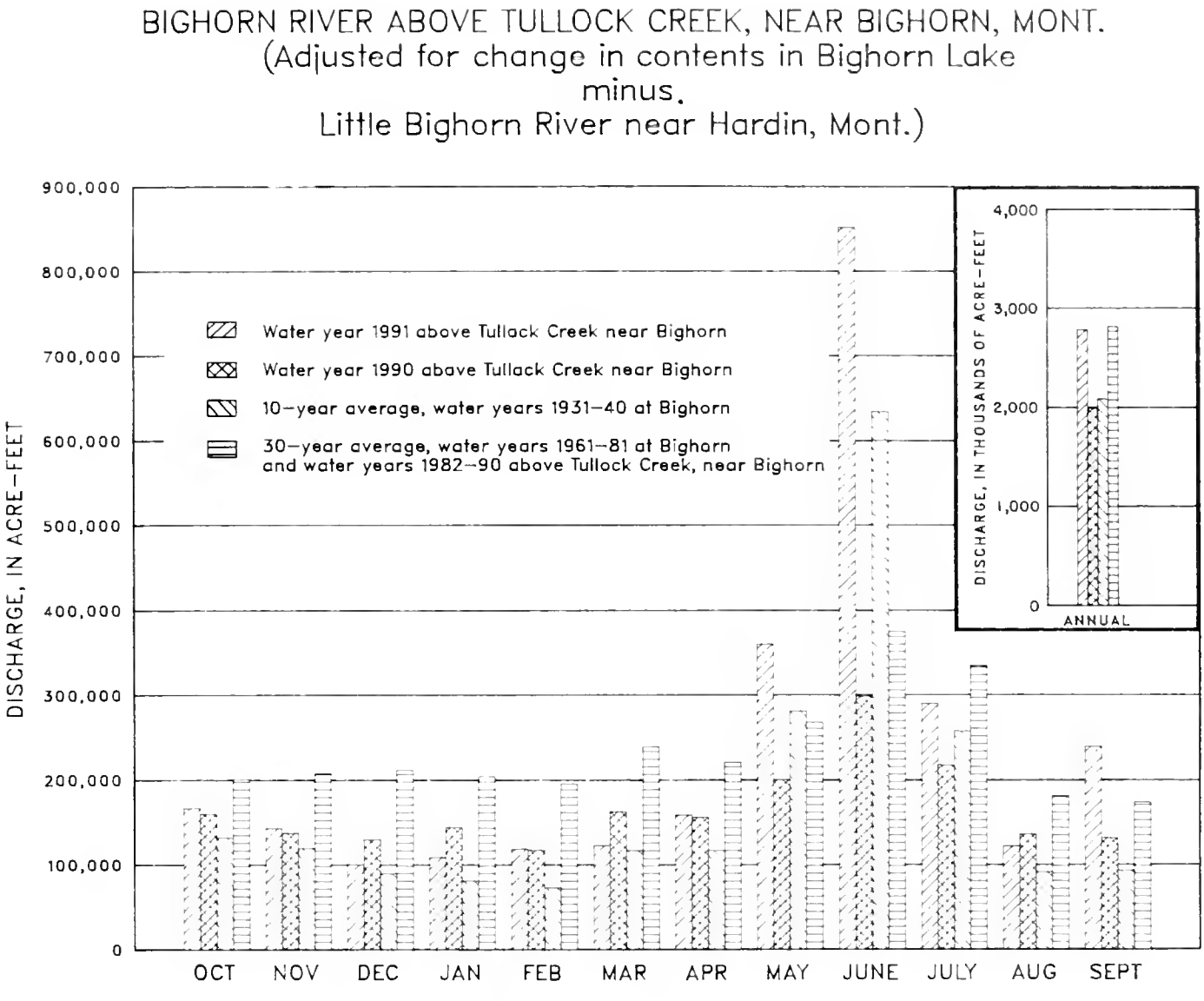

Figure 2.--Comparison of discharge of the Bighorn River during water year 1991 with discharge during water year 1990 and with 10-year and 30-year average discharges.

06308500 Tongue River at Miles City, Mont.

LOCATION.--Lat 46°20'44", long 105°48'10", in NE1/4 NE1/4 SE1/4 sec. 23, T. 7 N., R. 47 E., Custer County, Hydrologic Unit 10090102, on right bank 4 mi south of Miles City and at river mile 8.1.

DRAINAGE AREA.--5,379 mi^2.

PERIOD OF RECORD.--April 1938 to April 1942, April 1946 to current year. Published as "near Miles City" April 1938 to April 1942. Not equivalent to records published as "near Miles City" May 1929 to October 1932. Monthly discharges only for some periods, published in WSP 1309. Records since January 1950 available in annual reports of Yellowstone River Compact Commission.

GAGE.--Water-stage recorder. Datum of gage is 2,375.76 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). April 1938 to April 1942, nonrecording gage at site 8 mi upstream at different datum. April 1946 to Sept. 30, 1963, at datum 1.00 ft higher.

REMARKS.--Estimated daily discharges: Nov. 7, 8, Nov. 25 to Mar. 10, June 6-11. Records good except those for Mar. 23 to Apr. 20, which are fair, and those for estimated daily discharges, which are poor. Flow regulation by Tongue River Reservoir (see section "Monthly summary of contents for Compact reservoirs existing on January 1, 1950") and many small reservoirs in Wyoming (combined capacity, about 15,000 acre-ft). Diversions for irrigation of about 100,800 acres upstream from station. U.S. Army Corps of Engineers satellite telemeter at station.

AVERAGE DISCHARGE.--48 years (1938-41, 1946-91), 420 ft^3/s, 304,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 13,300 ft^3/s, June 15, 1962, gage height, 12.33 ft, present datum, from rating curve extended above 8,220 ft^3/s on basis of float measurement; maximum gage height, 13.27 ft, Mar. 19, 1960, Feb. 15, 1971, ice jam, present datum; no flow July 9-19, Aug. 13, 14, Sept. 28, 1940.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 3,610 ft^3/s, Sept. 15, gage height, 6.67 ft; minimum daily discharge, 32 ft^3/s, Sept. 5, 6.

Month	Second-foot days	Mean daily discharge (ft^3/s)	Maximum daily discharge (ft^3/s)	Minimum daily discharge (ft^3/s)	Discharge, in acre-feet (rounded)
October 1990	5,111	165	269	76	10,140
November	8,650	288	324	216	17,160
December	6,340	205	350	90	12,580
January 1991	4,125	133	180	90	8,180
February	4,380	156	200	110	8,690
March	7,166	231	430	135	14,210
April	14,287	476	1,700	128	28,340
May	36,449	1,176	2,430	482	72,300
June	42,112	1,404	2,330	581	83,530
July	9,837	317	554	155	19,510
August	6,469	209	428	145	12,830
September 1991	7,371	246	1,780	32	14,620
1991 water year	152,297	417	2,430	32	302,100

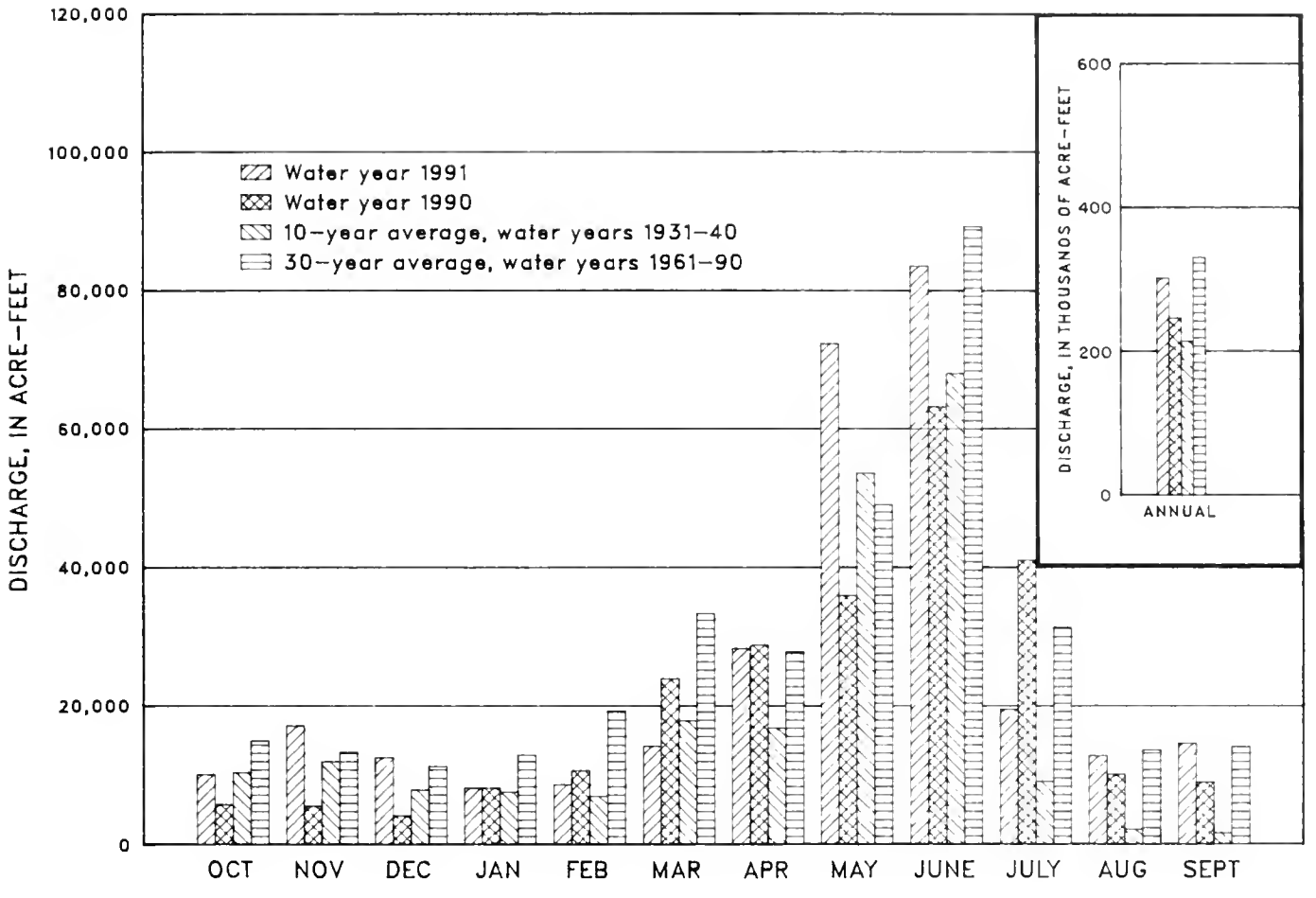

Figure 3.--Comparison of discharge of the Tongue River during water year 1991 with discharge during water year 1990 and with 10-year and 30-year average discharges.

06326500 Powder River near Locate, Mont.

LOCATION.--Lat 46°26'56", long 105°18'44", in NW1/4 SW1/4 sec. 14, T. 8 N., R. 51 E., Custer County, Hydrologic Unit 10090209, on left bank 1.5 mi downstream from bridge on old U.S. Highway 12 at present site of Locate, 1.5 mi upstream from Locate Creek, 5 mi west of former site of Locate, 25 mi east of Miles City, and at river mile 27.9.

DRAINAGE AREA.--13,194 mi^2. Drainage area at site 1.5 mi upstream, 13,189 mi^2.

PERIOD OF RECORD.--March 1938 to current year. Records since January 1950 available in annual reports of Yellowstone River Compact Commission.

REVISED RECORDS.--WSP 926: 1939. WSP 1309: 1938-39 (M). WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 2,384.79 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to July 11, 1947, nonrecording gage at bridge 1.5 mi upstream, and July 11, 1947, to Sept. 30, 1965, water-stage recorder at site near upstream bridge at different datum. Oct. 1, 1965, to Oct. 4, 1966, nonrecording gage, and Oct. 5, 1966, to Mar. 21, 1978, water-stage recorder at present site and datum. Mar. 22, 1978, to Apr. 23, 1981, water-stage recorder 1.5 mi upstream at different datum; Apr. 24 to Aug. 20, 1981, water-stage recorder at present site and datum; and Aug. 21, 1981, to Sept. 30, 1981, water-stage recorder 1.5 mi upstream at different datum.

REMARKS.--Estimated daily discharges: Nov. 4-9, Nov. 26 to Mar. 14, May 28-30. Records fair except those for estimated daily discharges, and May 31 to July 9, which are poor. Some regulation by three reservoirs in Wyoming with combined usable capacity of 36,800 acre-ft. Diversions for irrigation of about 101,800 acres upstream from station. U.S. Army Corps of Engineers satellite telemeter at station.

AVERAGE DISCHARGE.--53 years, 580 ft^3/s, 420,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge observed, 31,000 ft^3/s, Feb. 19, 1943, maximum gage height, 12.27 ft, Mar. 16, 1978, backwater from ice; no flow on many days in 1950, 1960-61, and 1988.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,000 ft^3/s and maximums(*):

Date	Time	Discharge, in ft^3/s	Gage height, in feet
May 24	0815	*4,070	*5.70

No peaks greater than base discharge this year.

Minimum discharge, 5.4 ft^3/s, Sept. 9.

Month	Second-foot days	Mean daily discharge (ft^3/s)	Maximum daily discharge (ft^3/s)	Minimum daily discharge (ft^3/s)	Discharge, in acre-feet (rounded)
October 1990	6,164	199	294	118	12,230
November	7,629	254	312	90	15,130
December	5,130	165	260	80	10,180
January 1991	3,630	117	140	100	7,200
February	6,170	220	300	150	12,240
March	17,418	562	1,300	250	34,550
April	18,149	605	1,530	321	36,000
May	47,058	1,518	3,380	349	93,340
June	40,665	1,355	2,440	473	80,660
July	5,046	163	574	29	10,010
August	1,431	46.2	125	10	2,840
September 1991	3,464.8	115	712	5.7	6,870
1991 water year	161,954.8	444	3,380	5.7	321,200

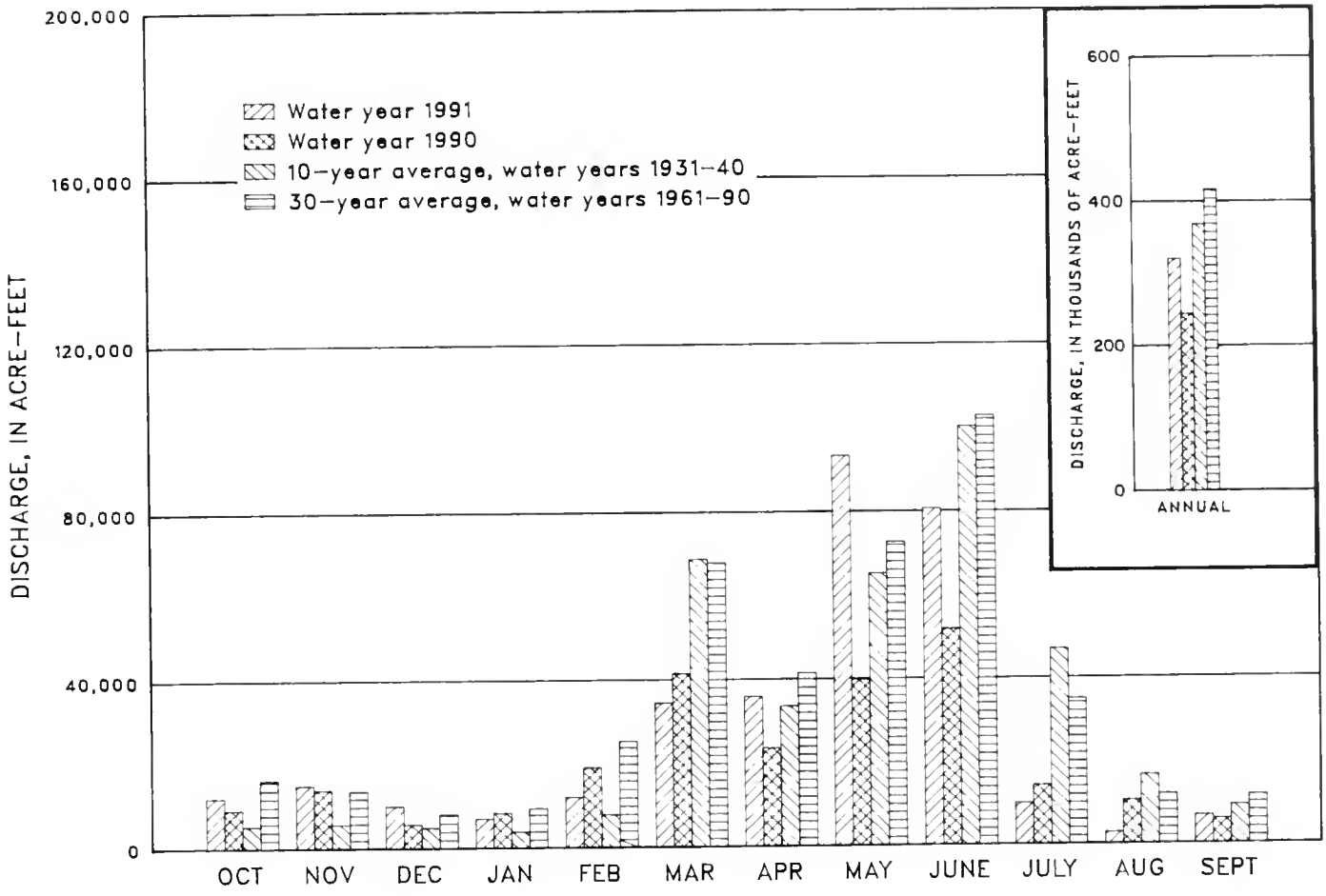

Figure 4.--Comparison of discharge of the Powder River during water year 1991 with discharge during water year 1990 and with 10-year and 30-year average discharges.

MONTHLY SUMMARY OF CONTENTS FOR COMPACT RESERVOIRS COMPLETED AFTER JANUARY 1, 1950

06258900 Boysen Reservoir, Wyo.

LOCATION.--Lat 43°25'00", long 108°10'37", in NW1/4 NW1/4 sec. 16, T. 5 N., R. 6 E., Fremont County, Hydrologic Unit 10080005, at dam on Wind River and 13 mi north of Shoshoni, Wyoming.

DRAINAGE AREA.--7,700 mi^2.

PERIOD OF RECORD.--October 1951 to current year (monthend contents only).

GAGE.--Water-stage recorder. Datum of gage is referenced to National Geodetic Vertical Datum of 1929 (levels by U.S. Bureau of Reclamation).

REMARKS.--Reservoir is formed by rock-fill dam completed in October 1951. Storage began Oct. 11, 1951. Usable capacity, 742,100 acre-ft between elevation 4,657.00 ft, invert of penstock pipe, and 4,725.00 ft, top of spillway gate. Dead storage, 59,880 acre-ft below elevation 4,657.00 ft. Prior to Jan. 1, 1966, usable capacity was 757,800 acre-ft and dead storage was 62,000 acre-ft at same elevations. Crest of dam is at elevation 4,758 ft. Figures given herein represent usable contents. Water used for irrigation, flood control, and power development.

COOPERATION.--Elevations and capacity table furnished by U.S. Bureau of Reclamation.

EXTREMES FOR PERIOD OF RECORD.--Maximum usable daily contents, 862,500 acre-ft, July 6, 7, 1967, elevation, 4,730.83 ft; minimum usable daily since normal use of water started, 191,900 acre-ft, Mar. 18, 19, 1956, elevation, 4,684.18 ft, capacity table then in use.

EXTREMES FOR CURRENT YEAR.--Maximum usable contents, 827,300 acre-ft, June 16, elevation, 4,729.18 ft; minimum usable, 525,500 acre-ft, Feb. 8-16, elevation, 4,712.67 ft.

Month	Water-surface elevation, in feet	Usable contents, in acre-feet	Change in usable contents, in acre-feet
September 30, 1990.	4,713.13	532,700	---
October 31.	4,713.53	539,100	+6,400
November 30	4,714.22	550,100	+11,000
December 31	4,713.20	533,800	-16,300
January 31, 1991.	4,712.78	527,300	-6,500
February 28	4,712.85	528,300	+1,000
March 31.	4,713.49	538,400	+10,100
April 30.	4,713.75	542,600	+4,200
May 31.	4,720.01	648,600	+106,000
June 30	4,725.60	754,000	+105,400
July 31	4,723.60	715,100	-38,900
August 31	4,721.66	678,700	-36,400
September 30, 1991.	4,719.91	646,900	-31,800
1991 water year			+114,200

06260300 Anchor Reservoir, Wyo.

LOCATION.--Lat 43°39'50", long 108°49'27", in sec. 26, T. 43 N., R. 100 W., Hot Springs County, Hydrologic Unit 10080007, at dam on South Fork Owl Creek, 2 mi downstream from Middle Fork, 3 mi southeast of Anchor, and 32 mi west of Thermopolis.

DRAINAGE AREA.--131 mi^2.

PERIOD OF RECORD.--November 1960 to current year (monthend contents only).

GAGE.--Water-stage recorder. Datum of gage is referenced to National Geodetic Vertical Datum of 1929 (U.S. Bureau of Reclamation benchmark).

REMARKS.--Reservoir is formed by concrete arch dam completed in 1960. Usable capacity, 17,160 acre-ft between elevation 6,343.75 ft, invert of river outlet, and 6,441.00 ft, spillway crest, not including 68 acre-ft below elevation 6,343.75 ft. Prior to Oct. 1, 1971, usable capacity was 17,280 acre-ft not including 149 acre-ft below the invert. Figures given herein represent usable contents. Water is used for irrigation of land in Owl Creek basin.

COOPERATION.--Records furnished by U.S. Bureau of Reclamation.

EXTREMES FOR PERIOD OF RECORD.--Maximum usable daily contents, 9,250 acre-ft, July 4, 1967, elevation, 6,418.52 ft; no storage on many days each year.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 7,910 acre-ft, June 12, elevation, 6,414.10 ft; minimum, 43 acre-ft, Sept. 2-8, elevation, 6,341.00 ft.

Month	Water-surface elevation, in feet	Usable contents, in acre-feet	Change in usable contents, in acre-feet
September 30, 1990.	6,346.00	91	---
October 31.	6,348.00	120	+29
November 30	6,348.00	120	0
December 31	6,356.40	290	+170
January 31, 1991.	6,351.00	170	-120
February 28	6,355.00	250	+80
March 31.	6,357.90	342	+92
April 30.	6,366.00	680	+338
May 31.	6,406.60	5,750	+5,070
June 30	6,408.00	6,050	+300
July 31	6,370.60	960	-5,090
August 31	6,342.00	51	-909
September 30, 1991.	6,364.60	610	+559
1991 water year			+519

06286400 Bighorn Lake near St. Xavier, Mont.

LOCATION.--Lat 45°18'27", long 107°57'26", in SW1/4 SE1/4 sec. 18, T. 6 S., R. 31 E., Big Horn County, Hydrologic Unit 10080010, in block 13 of Yellowtail Dam on Bighorn River, 1.3 mi upstream from Grapevine Creek, 15.5 mi southeast of St. Xavier, and at river mile 86.6.

DRAINAGE AREA.--19,626 mi^2.

PERIOD OF RECORD.--November 1965 to current year (monthend contents only). Prior to October 1969, published as "Yellowtail Reservoir."

GAGE.--Water-stage recorder in powerhouse control room. Datum of gage is referenced to National Geodetic Vertical Datum of 1929 (levels by U.S. Bureau of Reclamation).

REMARKS.--Reservoir is formed by thin concrete-arch dam; construction began in 1961; completed in 1967. Storage began Nov. 3, 1965. Usable capacity, 1,356,000 acre-ft between elevation 3,296.50 ft, river outlet invert, and 3,657.00 ft, top of flood control. Elevation of spillway crest, 3,593.00 ft. Normal maximum operating level, 1,097,000 acre-ft, elevation, 3,640.00 ft. Minimum operating level, 483,400 acre-ft, elevation 3,547.00 ft. Dead storage, 16,010 acre-ft below elevation 3,296.50 ft. Figures given herein represent usable contents. Water is used for power production, flood control, irrigation, and recreation.

COOPERATION.--Elevations and capacity table furnished by U.S. Bureau of Reclamation.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily contents, 1,346,000 acre-ft, July 6, 1967, elevation, 3,656.43 ft; minimum since first filling, 641,900 acre-ft, Apr. 14, 1989, elevation, 3,583.30 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 1,151,000 acre-ft, June 26, elevation, 3,647.11 ft; minimum, 700,300 acre-ft, Apr. 11, elevation, 3,594.77 ft.

Month	Water-surface elevation, in feet	Usable contents, in acre-feet	Change in usable contents, in acre-feet
September 30, 1990	3,632.87	972,200	---
October 31	3,633.03	973,900	+1,700
November 30	3,631.42	957,400	-16,500
December 31	3,622.80	879,800	-77,600
January 31, 1991	3,608.11	775,500	-104,300
February 28	3,600.96	733,900	-41,600
March 31	3,596.35	708,700	-25,200
April 30	3,598.88	722,400	+13,700
May 31	3,627.19	917,400	+195,000
June 30	3,646.34	1,141,000	+223,600
July 31	3,637.52	1,024,000	-117,000
August 31	3,635.00	995,000	-29,000
September 30, 1991	3,639.36	1,046,000	+51,000
1991 water year			+73,800

MONTHLY SUMMARY OF CONTENTS FOR COMPACT RESERVOIRS EXISTING ON JANUARY 1, 1950

The extent, if any, of the use of reservoirs in this section which may be subject to Compact allocations was not determined. As a matter of hydrologic interest the monthend contents in acre-feet of four reservoirs are given. The first three reservoirs are in the Bighorn River basin, Wyoming, and data on contents were furnished by the U.S. Bureau of Reclamation. The Tongue River Reservoir in Montana is operated under the supervision of the Water Resources Division of the Montana Department of Natural Resources and Conservation, which furnished the operating data.

	Contents, in acre-feet			
Month	06224500 a/Bull Lake	b/Pilot Butte Reservoir	06281500 c/Buffalo Bill Reservoir	06307000 d/Tongue River Reservoir
September 30, 1990. . .	82,800	18,580	162,600	---
October 31.	85,960	27,660	159,500	27,400
November 30	89,860	27,150	166,700	---
December 31	91,350	27,060	163,400	---
January 31, 1991. . . .	92,140	26,900	170,100	---
February 28	92,400	26,720	178,100	---
March 31.	92,670	29,660	186,600	19,150
April 30.	88,860	29,300	185,700	13,300
May 31.	115,500	29,120	273,500	36,000
June 30	148,200	27,380	459,800	64,620
July 31	140,900	17,240	411,500	41,100
August 31	109,700	15,320	325,500	20,220
September 30, 1991. . .	84,940	13,230	275,000	20,080
Change in contents during water year. .	+2,140	-5,350	+112,400	---

a/ Usable contents, from revised capacity table effective October 1, 1965. Dead storage is 722 acre-ft.

b/ Usable contents. Dead storage is 5,360 acre-ft.

c/ Usable contents, from revised capacity table based on survey of 1959. Usable contents prior to October 1960 based on survey of 1941. Dead storage is negligible.

d/ Usable contents. Dead storage is 1,400 acre-ft. Contents based upon sedimentation surveys of October 1948.

RULES AND REGULATIONS FOR ADMINISTRATION OF
THE YELLOWSTONE RIVER COMPACT

A compact, known as the Yellowstone River Compact, between the States of Wyoming, Montana, and North Dakota, having become effective on October 30, 1951, upon approval of the Congress of the United States, which apportions the waters of certain interstate tributaries of the Yellowstone River which are available after the appropriative rights existing in the States of Wyoming and Montana on January 1, 1950 are supplied, and after appropriative rights to the use of necessary supplemental water are also supplied as specified in the Compact, is administered under the following rules and regulations subject to the provisions for amendment revision or abrogation as provided herein.

Article I. Collection of Water Records

A. It shall be the joint and equal responsibility of the members of the States of Wyoming and Montana to collect, cause to be collected, or otherwise furnish records of tributary streamflow at the points of measurement specified in Article V (B) of the Compact, or as near thereto as is physically or economically feasible or justified.

1. Clarks Fork

The gaging station known as Clarks Fork near Silesia, Montana and located in NW1/4 SE1/4 sec. 1, T. 4 S., R. 23 E., shall be the point of measurement for the Clarks Fork.

2. Bighorn River (exclusive of Little Bighorn River)

The gaging station known as the Bighorn River above Tullock Creek, near Bighorn, Montana, and located in SE1/4 SE1/4 NE1/4 sec. 3, T. 4 N., R. 34 E., shall temporarily be the designated point of measurement on that stream. The flow of the Little Bighorn River as measured at the gaging station near Hardin, Montana, and located in SE1/4 NE1/4 NE1/4 sec. 19, T. 1 S., R. 34 E., shall be considered the point of measurement for that stream, except that if or when satisfactory records are not available, the records for the nearest upstream station with practical corrections for intervening inflow or diversion shall be used.

3. Tongue River

The gaging station known as the Tongue River at Miles City, Montana, and located in NE1/4 NE1/4 SE1/4 sec. 23, T. 7 N., R. 47 E., shall temporarily be the point of measurement for that stream.

4. Powder River

The gaging station known as the Powder River near Locate, Montana, and located in NW1/4 SW1/4 sec. 14, T. 8 N., R. 51 E., shall temporarily be the designated point of measurement for that stream.

B. Records of total annual diversion in acre-feet above the points of measurement designated in the Compact for irrigation, municipal, and industrial uses developed after January 1, 1950, shall be furnished by the members of the Commission for their respective States, at such time as the Commission deems necessary for interstate administration as provided by the terms of the Compact. Providing that if it be acceptable to the Commission, reasonable estimates thereof may be substituted.

C. Annual records of the net change in storage in all reservoirs, not excluded under Article V (E) of the Compact, above the point of measurement specified in the Compact and completed after January 1, 1950, and the annual net change in reservoirs existing prior to January 1, 1950, which is used for irrigation, municipal, and industrial purposes developed after January 1, 1950, shall be the primary responsibility of the member of the Commission in whose State such works are located; providing such data are not furnished by Federal agencies under the provisions of Article III (D) of the Compact, or collected by the Commission.

Article II. Office and Officers

A. The office of the Commission shall be located at the office of the Chairman of the Commission.

B. The Chairman of the Commission shall be the Federal representative as provided in the Compact.

C. The Secretary of the Commission shall be as provided for in Article III of these rules.

D. The credentials of each member of the Commission shall be placed on file in the office of the Commission.

Article III. Secretary

A. The Commission, subject to the approval of the Director of the United States Geological Survey, shall enter into cooperative agreements with the U.S. Geological Survey for such engineering and clerical services as may reasonably be necessary for the administration of the Compact. Said agreements shall provide that the Geological Survey shall:

1. Maintain and operate gaging stations at or near the points of measurement specified in Article V (A) of the Compact.

2. Assemble factual information on stream flow, diversion, and reservoir storage for the preparation of an annual report to the Governors of the signatory States.

3. Make such investigations and reports as may be requested by the Commission in aid of its administration of the Compact.

B. The Geological Survey shall act as Secretary to the Commission.

Article IV. Budget

A. At the annual meeting of each even-numbered year or prior thereto, the Commission shall adopt a budget for operation during the ensuing biennium beginning July first. Such budget shall set forth the total cost of construction, maintenance and operation of gaging stations, the cost of engineering and clerical aid, and other necessary expenses excepting the salaries and personal expenses of the Commissioners. On odd-numbered years revisions of the budget shall be considered.

B. It shall be the obligation of the Commissioners of the States of Montana and Wyoming to endeavor to secure from the Legislature of their respective States sufficient funds with which to meet the obligations of this Compact, except insofar as provided by the Federal government.

Article V. Meetings

An annual meeting of the Commission shall be held each November at some mutually agreeable point in the Yellowstone River Basin for consideration of the annual report for the water year ending the preceding September 30th, and for the transaction of such other business consistent with its authority; provided that by unanimous consent of the Commission the date and place of the annual meeting may be changed. Other meetings as may be deemed necessary shall be held at a time and place set by mutual agreement, for the transaction of any business consistent with its authority.

No action of the Commission shall be effective until approval by the Commissioners for the States of Wyoming and Montana.

Article VI. Amendments, Revisions and Abrogations.

The Rules and Regulations of the Commission may be amended or revised by a unanimous vote at any meeting of the Commission.

Gary Fritz
Commissioner for Montana

George L. Christopulos
Commissioner for Wyoming

ATTESTED:

L. Grady Moore
Federal Representative

Adopted November 17, 1953
Amended December 16, 1986

RULES FOR ADJUDICATING WATER RIGHTS ON INTERSTATE DITCHES

Article I. Purpose

The purpose of this rule is to determine and adjudicate, in accordance with the laws of Montana and Wyoming, those pre-Compact (January 1, 1950) water rights diverting from the Powder, Tongue, Bighorn and Clarks Fork Rivers and their tributaries where the point of diversion is in one State and the place of use is in the other State which have not yet been adjudicated.

Article II. Authority

In accordance with the Yellowstone River Compact, the State of Montana and the State of Wyoming, being moved by consideration of interstate comity, desire to remove all causes of present and future controversy between the States and between persons in one State and persons in another State with respect to these interstate ditches. Article III (E) of the Compact provides the Yellowstone River Compact Commission with the authority "...to formulate rules and regulations and to perform any act which they may find necessary to carry out the provisions of this Compact...."

Article III. Definitions

The terms defined in the Yellowstone River Compact apply as well as the following definitions:

1. "Acre-feet" means the volume of water that would cover 1 acre of land to a depth of 1 foot.

2. "Cfs" means a flow of water equivalent to a volume of 1 cubic foot that passes a point in 1 second of time and is equal to 40 miners inches in Montana.

3. "Interstate Ditches" shall include ditches and canals which convey waters of the Bighorn, Tongue, Powder, and Clarks Fork Rivers and their tributaries across the Wyoming-Montana State line where the water is diverted in one State and the place of use is in the other State.

4. "Department of Natural Resources and Conservation," hereafter called the "Department," means the administrative agency and Department of the Executive Branch of the Government of Montana created under Title II, Chapter 15, MCA which has the responsibility for water administration in that State.

5. "Water Court" means a Montana District Court presided over by a water judge, as provided for in Title III, Chapter 7, MCA.

6. "State Engineer" shall be the current holder of the position created by the Wyoming Constitution as Chief Water Administration Official for the State of Wyoming.

7. "Board of Control," hereinafter called the "Board," is defined as the constitutionally created water management agency in Wyoming composed of the four Water Division Superintendents and the State Engineer.

8. "Superintendent" is the member of the Board who is the water administration official for the Water Division where the interstate ditch is located. (The two Water Divisions in the Yellowstone River drainage are Water Division Numbers Two and Three.)

9. "Date of Priority" shall mean the earliest date of actual beneficial use of water, unless evidence and circumstances pertaining to a particular claim establish an earlier date.

10. "Point of Diversion" is defined to be the legal land description by legal subdivision, section, township, and range of the location of the diversion structure for an interstate ditch from a natural stream channel.

11. "Place of Use" is defined to be the legal land description (legal subdivision, section, township, and range) of the lands irrigated by an interstate ditch.

12. "Person" is defined as an individual, a partnership, a corporation, a municipality or any other legal entity, public or private.

13. "Claimant" is defined as any person claiming the use of water from an interstate ditch as herein defined.

Article IV. Procedures

The procedures for determining and adjudicating water rights associated with interstate ditches shall be categorized as follows: (A) Where the point of diversion is in Wyoming and place of use in Montana, and (B) Where the point of diversion is in Montana and place of use in Wyoming.

A. Wyoming Procedure

1. The Yellowstone River Compact Commission will provide a claim form to be completed by the claimant that will describe the location and point of diversion and land being irrigated, the priority date claimed, method of irrigation and such other information required to describe the claim. (A sample form for this purpose is attached.)

2. The Yellowstone River Compact Commission will send the claim form to water users on the interstate ditches.

3. Water users will complete the claim form and file it with the Yellowstone Compact Commission, which, when found to be correct and complete, will be forwarded to the Board for verification.

4. Upon receipt of the form, the Board shall forward it to the appropriate Superintendent, who, in cooperation with the Department, will validate the information including the use that has been made of the water, the number of acres and location of lands being irrigated, the priority date, and all other relevant information. The Superintendent and the Department will utilize aerial photography and other information to have prepared a reproducible map showing the location of the ditch system, lands irrigated, point of diversion, etc., of the claim.

5. After the validation procedure, the Superintendent will hold a hearing, after appropriate notice and advertisement, at which time the claimant shall describe, in detail, the use that has been made of the water and the lands that are being irrigated, establish a priority date, etc. Costs incurred in advertising shall be paid by the claimant. If a single hearing is held to consider several claims, the costs of advertising shall be shared equally among the claimants. Anyone who opposes the claim shall appear and state the reasons, if any, for opposition to the claim. If there is no opposition to the claim, cost incurred in holding the hearing shall be paid by the claimant. If protestants do appear and oppose the claim, hearing costs will be paid 50 percent by the claimant and 50 percent by the protestant, or if there is more than one protestant, the remaining 50 percent shall be shared equally among the protestants.

6. At the conclusion of the hearing, the Superintendent shall forward the record to the Yellowstone River Compact Commission with his findings and recommendations. The Yellowstone River Compact Commission will make the

determination of the amount of the right, the location, and the priority date, and then send the record to the Board.

7. The Board shall review the record and integrate it into its water rights system. Upon entry of the record by the Board, the information shall be forwarded to the Department and the Chairman of the Yellowstone River Compact Commission.

8. Upon the entry of the right into the Board's records, it will have the following attributes:

   a. The right will be a Wyoming water right with a priority date as established by this procedure.

   b. The amount of the right will be determined as provided by Wyoming law.

B. Montana Procedure

1. The Yellowstone River Compact Commission will provide a claim form to be completed by the claimant that will describe the location and point of diversion and land being irrigated, the priority date claimed, method of irrigation and such other information required to describe the claim.

2. The Commission will send the claim form to water users on the interstate ditches.

3. Water users will complete the claim form and file it with the Yellowstone River Compact Commission, which, when found to be correct and complete, will be forwarded to the Department for verification.

4. Upon receipt of the form, the Department, in cooperation with the Wyoming State Engineer's Office, will validate the information, including the use that has been made of the water, the number of acres and location of lands being irrigated, the priority date, and all other relevant information. The appropriate Superintendent and the Department will utilize aerial photographs and other information to have prepared a reproducible map showing the location of the ditch system, land irrigated, point of diversion, etc., of the claim.

5. The Department will then forward the record to the Yellowstone River Compact Commission with its findings and recommendations. Upon approval by the Commission, the record shall be submitted to the Montana Water Court for adjudication. A duplicate record will be forwarded to the Wyoming State Engineer's Office, the Board, and the Chairman of the Yellowstone River Compact Commission upon adjudication.

6. Upon adjudication of the right by the Montana Water Court, it will have the following attributes:

   a) The right will be a Montana water right with a priority date as established by this procedure.

   b) The amount of the right will be determined as provided by Montana law.

Article V. Exclusions

A. These rules recognize the limitation in Article VI of the Yellowstone River Compact regarding Indian water rights.

B. These rules shall not be construed to determine or interpret the rights of the States of Wyoming and Montana to the waters of the Little Bighorn River.

Article VI. Claim Form Submission Period

All claims must be submitted to the Yellowstone River Compact Commission, c/o District Chief, United States Geological Survey, 821 E. Interstate, Bismarck, ND 58501, within 90 calendar days after the claimant has received the claim form from the Commission. The blank claim form will be sent certified mail to the water user and the submission period of 90 calendar days will begin with the next day following receipt of the form, as evidenced by the certified mail receipt card. For good cause shown in writing, an extension of time beyond the 90 days for submittal may be obtained from the Commission.

YELLOWSTONE RIVER COMPACT COMMISSION

WYOMING

GORDON W. FASSETT
STATE ENGINEER
HERSCHLER BUILDING
4TH FLOOR EAST
CHEYENNE, WYOMING 82002
(307) 777-7354

UNITED STATES

WILLIAM F. HORAK
CHAIRMAN
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821 E. INTERSTATE AVENUE
BISMARCK, NORTH DAKOTA 58501
(701) 250-4601

MONTANA

GARY FRITZ
ADMINISTRATOR, WATER RESOURCES DIVISION
DEPT. OF NATURAL RESOURCES & CONSERVATION
1520 EAST SIXTH AVENUE
HELENA, MONTANA 59620
(406) 444-6603

YELLOWSTONE RIVER COMPACT COMMISSION

CLAIM FORM FOR INTERSTATE DITCHES

1. Name of ditch or canal: _____

2. Source of water supply: _____

   Tributary of _____

3. Name of claimant: _____

   Address _____

   City _____ State _____ Zip Code _____

   Home Phone No. _____ Business Phone No. _____

4. Person completing form: _____

   Address _____

   City _____ State _____ Zip Code _____

   Home Phone No. _____ Business Phone No. _____

5. Method of irrigation: _____

6. Point of diversion: County _____ State _____

   Headgate located in the ___¼ ___¼, Section ____, T.___R.____

   (a) Description of headgate: (Briefly describe the materials and general features, date constructed or last known work, general condition.) _____

   _____

   _____

(b) Describe water measuring device: _____

_____

_____

(c) If the point of diversion is in Montana:

1. What flow rate has been claimed?

_____ ☐ cubic feet per second

☐ gallons per minute

☐ miner's inches

2. What volume of water has been claimed?

_____ acre-feet

7. Dimensions of ditch at headgate: Width at top (at waterline) _____ feet; width at bottom _____ feet; side slopes (vertical:horizontal) _____:_____; depth of water _____ feet; grade _____ feet per mile.

8. Place of use and acres irrigated: County_____ State ____ Give legal subdivisions of land owned by you on which water is being used (acres claimed): An example field is shown in the first line.

T.	R.	SEC.	NE¼				NW¼				SW¼				SE¼				TOTAL
			NE¼	NW¼	SW¼	SE¼	NE¼	MW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
58N	95W	18			25.1											10.2			35.3

9. Describe any additional uses of water claimed from the ditch: _____

10. Date of first beneficial use of water (priority date) on lands described above for _____ Ditch is_____ (mo/day/yr) and shall be the same for all lands claimed on this form.

11. Has irrigation water been diverted onto all lands shown in the above tabulation each year since completion of works?__ If not, state exceptions and reasons therefore: _____

_____

_____

12. Attach documentary evidence or affidavits showing your ownership or control of the above lands, as well as the historic use of water on these lands. _____

_____

_____

13. What permit or claim numbers have been assigned to known records filed with either the Wyoming State Engineer's Office or the Montana Department (DNRC) for irrigating the above lands? _____

_____

_____

14. Have personnel in the Wyoming State Engineer's Office or the Montana Department (DNRC) been contacted to obtain the information given in No. 13? ( ) Yes ( ) No

15. Describe any flumes or pipelines in the ditch conveyance system:_____

_____

_____

16. Describe ordinary annual period of use: _____ to _____
(mo/day) (mo/day)

_____.

17. Attach copies of aerial photographs, U. S. Geological Survey maps or other such documents showing the ditch and lands irrigated that give evidence to this claim and may be useful to the Commission.

* * * * * * * * * * *

State of _____)
) SS
State of _____)

I, _____, having been duly sworn, depose and say that I, being of legal age and being the claimant of this claim for a water right, and the person whose name is signed to it as the claimant, know the contents of this claim and the matters and things stated there are correct.

_____

_____

Subscribed and sworn before me, this ____day of _____, 19__.

_____
Notary Public

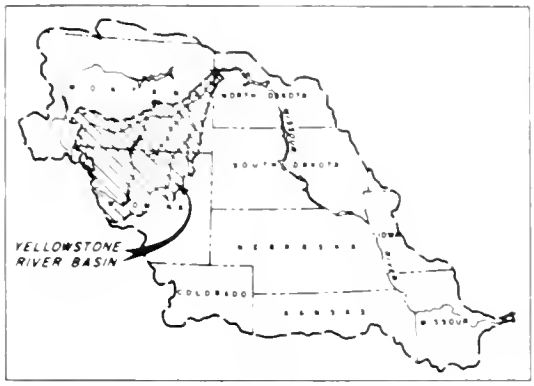
Residing at: _____

My commission expires: _____

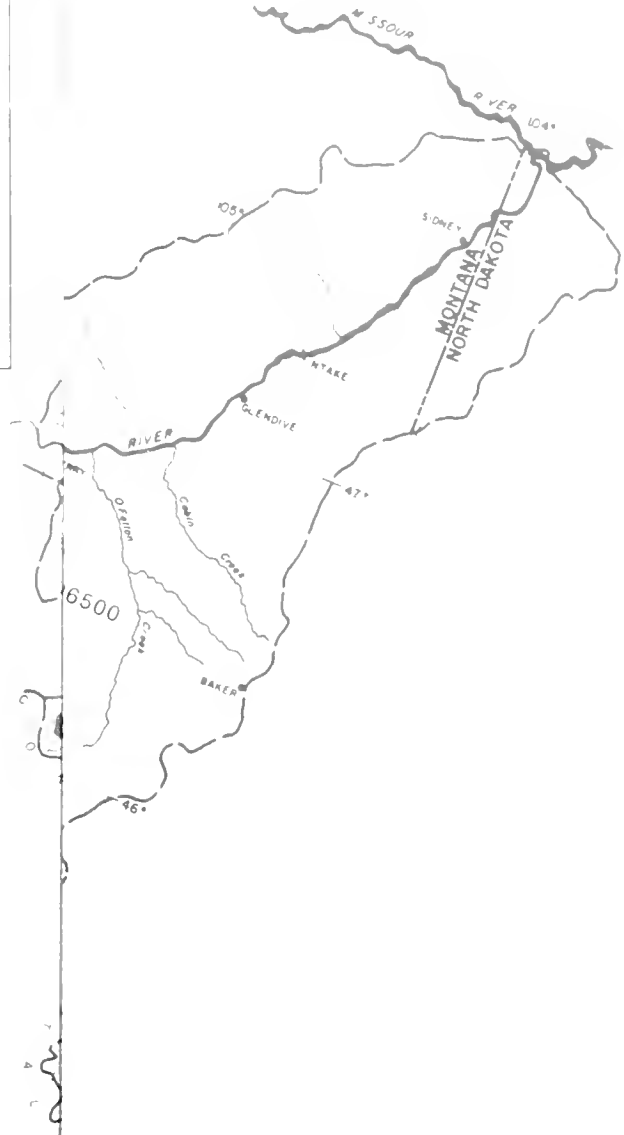
CONVERSION TABLE

Multiply inch-pound units	By	To obtain SI units
	Length	
feet (ft)	0.3048	meters (m)
miles (mi)	1.609	kilometers (km)
	Area	
acres	4,047	square meters (m^2)
	0.4047	*hectares (ha)
	0.4047	square hectometer (hm^2)
	0.004047	square kilometers (km^2)
square miles (mi^2)	2.590	square kilometers (km^2)
	Volume	
cfs-day or second-foot day (ft^3/s-day)	2,447	cubic meters (m^3)
	0.002447	cubic hectometers (hm^3)
cubic feet	0.02832	cubic meters
acre-feet (acre-ft)	1,233	cubic meters (m^3)
	0.001233	cubic hectometers (hm^3)
	0.000001233	cubic kilometers (km^3)
	Flow	
cubic feet per second (ft^3/s)	28.32	liters per second (L/s)
	28.32	cubic decimeters per second (dm^3/s)
	0.02832	cubic meters per second (m^3/s)
acre-feet per year (acre-ft/yr)	1,233	cubic meters per year (m^3/yr)
	0.001233	cubic hectometers per year (hm^3/yr)
	0.000001233	cubic kilometers per year (km^3/yr)

*The unit hectare is approved for use with the International System (SI) for a limited time. See National Bureau of Standards Special Bulletin 330, p. 12, 1977 edition.



LOCATION MAP



YELLOWSTONE RIVER COMPACT COMMISSION

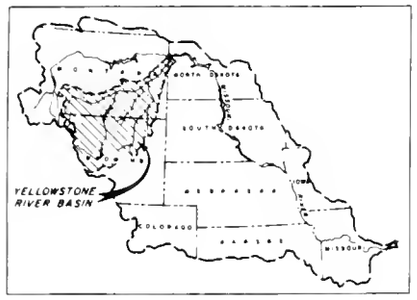
YELLOWSTONE RIVER BASIN

EXPLANATION

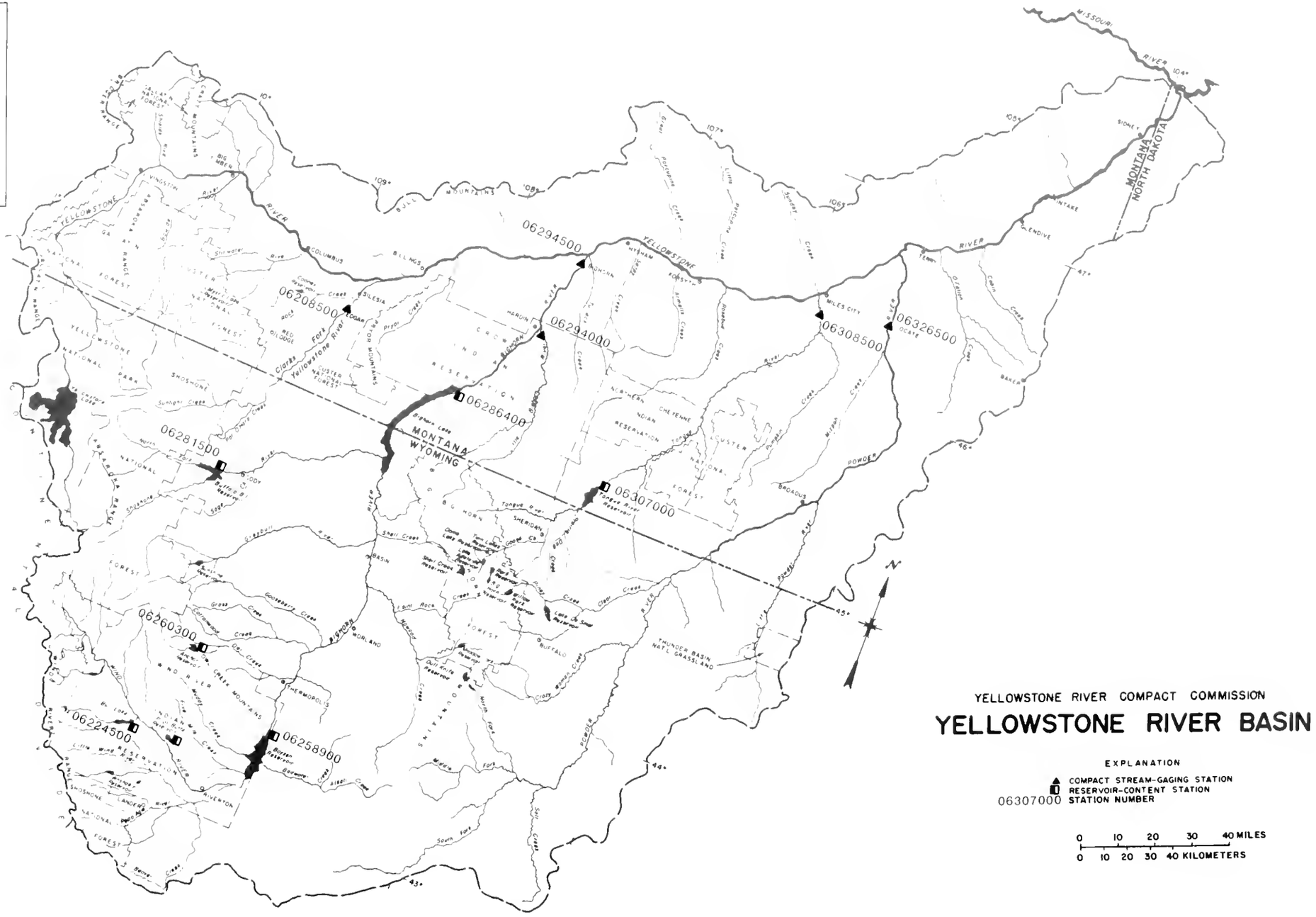
▲ COMPACT STREAM-GAGING STATION
◧ RESERVOIR-CONTENT STATION
06307000 STATION NUMBER

0 10 20 30 40 MILES
0 10 20 30 40 KILOMETERS

MAP SHOWING LOCATIONS



LOCATION MAP



YELLOWSTONE RIVER COMPACT COMMISSION

YELLOWSTONE RIVER BASIN

EXPLANATION

▲ COMPACT STREAM-GAGING STATION

▮ RESERVOIR-CONTENT STATION

06307000 STATION NUMBER

0 10 20 30 40 MILES

0 10 20 30 40 KILOMETERS

MAP SHOWING LOCATIONS OF COMPACT STREAM-GAGING AND RESERVOIR-CONTENT STATIONS